

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

March 11, 2010

TO: Internal File

THRU: April Abate, Team Lead. *QAA 7-7-2010*

FROM: Priscilla Burton, Environmental Scientist III/Soils. *PWB by SJS*

RE: Crandall Canyon – Phase I Bond Release, Plateau Mining Corporation, Willow Creek Mine, C/007/0038, Task #3467

SUMMARY:

The Permittee requested Phase I bond release on 32.96 acres of land in Crandall Canyon on November 30, 3009. This response to deficiencies was received March 8, 2010. The land under consideration is in T. 12 S., R. 9 E. portions of S/2 Section 28 and portions of S/2 NW/4; NE/4 NW/4; NW/4 SW/4 Section 27. The total area includes 15.93 acres that were graded and seeded, including the topsoil storage area no. 2 at the mouth of the canyon and the reclaimed shafts as identified on as-built reclamation treatment areas Map 3.7-16AB (Vol. 16, Ex. 20).

As Built information for these areas is found in Volume 16, Ex. 20 Section 3.7-5 and Appendix 3.7X of the MRP. The primary access road, and associated culverts and ditches, shown on Map 3.7-13AB, remain to provide access to private landholdings and recreational use in the canyon.

The Permittee has reclaimed the site in accordance with approved plans. Phase 1 bond release is recommended, pending a site visit scheduled for early May. The bond release site inspection will provide an indication of the stability of the site after almost 3 years. Due to the circumstances involved in the closure of shaft #2, the bond release inspection required by R645-301-880.220 will be instrumental to the Divisions decision to release Phase I bond.

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TECHNICAL ANALYSIS:

Crandall Canyon is a narrow canyon holding Crandall Creek, a tributary of the Price River. At its upper reaches, Crandall Canyon is at an elevation of 7,400 feet. As it converges with Price Canyon, the elevation is 6,400 feet. The natural topography of Crandall Canyon is characterized by steep canyon side slopes and a broad canyon bottom (Exhibits 3.7-1 and 3.7-2). The stream meanders from one side of the canyon to the other throughout the length of the canyon. Exhibit 3.7-7B and D show cross-sections of the undisturbed area of the canyon and illustrate the steep slopes cut by the stream through unconsolidated material.

There exists an unconfined aquifer in Crandall Canyon at a depth of approximately 30 - 60 feet at the unconsolidated soil/rock interface. The two ventilation shafts in Crandall Canyon intercepted this aquifer. As discussed in Section 3.7-5(3) (2), water flows in through the concrete lined shafts at a rate of approximately 13 - 50 gpm and is transmitted through the mine to the Blackhawk formation to recharge the regional aquifer.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The requirements for Phase I bond release are outlined in R645-301-880. The Division is required by R645-301-880.220 to conduct an evaluation of the reclamation work as soon as weather permits.

The backfilling and grading plan for 18.7 acres was presented on Exhibits 3.7-7A, 7B, 7C, and 7D and discussed in Section 3.7-5(3)(3). Reclamation slopes are concave in cross-section and do not exceed a slope of 2:1. Of these acres, 16 required topsoil. Topsoil was to be applied at a depth of twelve inches, requiring 25,800 cubic yards. Table 3.7-10 summarizes the proposed cut/fill calculations: 85,860 cubic yards of cut and 83,990 cubic yards of fill and 6,680 cubic yards of topsoil.

Earthwork (including seeding) at the Crandall Canyon site was completed in the fall of 2003. Substitute topsoil was obtained from the facilities area shown on Map 3.7-7B. The quality of the substitute topsoil is reported in Appendix 3.7S. Further information on topsoil is located in Section 3.7-5(5) and Exhibit 5, Volume 4, Figure 8-5 contains the soil test results for samples taken during Crandall Canyon development in 1981. There was no further testing of soil

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prior to its use. Soil from the facilities area and topsoil stockpile was graded over the final surface of the reclaimed shafts to a depth of one foot.

Reclamation as-built topography is shown on Maps 3.7-12 AB and 3.7-13AB and associated cross-sections on Map 3.7-14AB. According to the Crandall Canyon bond estimates 92,540 yd³ of earth was moved to rough grade the facilities area, another 30,920 yd³ were hauled from the facilities area to backfill the shaft areas; 3,340 yd³ of topsoil from stockpile No. 2, and 58,385 yd³ of facilities area substitute topsoil were graded over the site (Vol 9, Ex. 17). Topsoil stockpile No. 1 was contaminated with the noxious weed *Cardara draba*, commonly known as Hoary Cress or Whitetop. Topsoil stockpile No. 1 was not utilized and is not included in the application for Phase I bond release.

There were two shafts in Crandall Canyon described in Section 3.7-3(1). The No. 1 intake shaft was 26 ft. x 1,450 ft., with the shaft bottom elevation at 5,352 ft. The No. 2 return air shaft was 20 ft. X approximately 1,400 ft., with the shaft bottom elevation at 5,324 ft. After mine closure, water was measured at an elevation of 5,785 ft. that is 5 ft. below the roof of the D seam in the return shaft. A ventilation circuit existed between the shafts and the D seam as evidenced by in-gassing at the return shaft collar and out-gassing at the intake shaft collar (App. 3.7N). At the request of the BLM (letter from Sally Wisely to Lowell Braxton, dated October 23, 2001, the reclamation plan for shaft reclamation was changed and both shafts were backfilled to their full depths with spoil, rock, concrete fragments and bentonite, in accordance with the plan described in Appendix 3.7N. Soil was mounded over the shafts to allow for settlement.

Considerable settlement followed. The area surrounding Shaft No. 1 was reworked in 2005 to fill a void (approximately 15 ft. of settlement). Approximately 0.4 acres were redisturbed to fill the void over the No. 1 (upstream) shaft and the area was reseeded (Section 3.7-5(1)).

Shaft No. 2 subsidence was more extensive and required that fill be brought in from an outside source. Appendix 3.7X provides the As-Built documentation for the Shaft No. 2 reclamation work. Initial backfilling was completed in 2003. Three years later in November 2006, it was discovered that the shaft fill had collapsed. The Division in meeting notes on February 2007 and May 2007 documented the situation. The Feb 2007 notes indicate that a first attempt at re-filling the void in November 2007 was done with 4,000 yd³ of surrounding soil. Subsequently, water saturated this fill and overtopped the shaft and was discharged to Crandall Creek. The water was sampled and analyzed. The Shaft was fenced and left for winter. On April 16, 2007, the UPDES permit was modified to authorize temporary discharge of this water to Crandall Creek (2007/Incoming/0012.pdf). The high TSS water was pumped from the shaft and allowed to settle in a catch basin before discharge to Crandall Canyon Creek. The Division's May 2007 notes indicate the depth of open shaft to be approximately 168 ft before water. ie. rock falls 3 - 4 sec @ approximately 32 ft/s², therefore approximately 168 ft of free

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fall before reaching water. A draft of the General Scope of Work was provided by email to the Division on April 19, 2007. Material excavated from the catch basin along with imported material from a Department of Transportation (UDOT) storage area was used to backfill the shaft. By April 21, 2007, the shaft was filled to 170 feet below the surface (Email from Dennis Ware dated April 30, 2007) with fill from the nearby UDOT road cut stockpile site near the junction of Hwy 6 and 191. The quantity of fill used was described in the General Scope of Work, which described the following backfill materials:

First, approximately 95 tons of dry cement will be mixed with equal parts of Contractor supplied 3" to 4" drain rock and dumped into the shaft.

Secondly, approximately 3,700 yards of fill material from the State Road pile on HWY 6 near the mouth of Crandall Canyon will be placed in the Shaft until it is filled to point 20 feet below the level of water inflow into the shaft or, if there is no water inflow, at a point 120 feet below the surface elevation.

Thirdly, 1,160 yards of bentonite will be placed in the shaft on top of the fill material for a distance of 100 feet starting at a point 20 feet below the level of water inflow into the shaft or, if there is no water inflow at a point 120 feet below the surface elevation.

Lastly, additional fill material from the State Road pile on HWY 6 near the mouth of Crandall Canyon will be placed atop the bentonite and brought up to the surface elevation and mounded a minimum of 5 feet above the surface elevation.

A column of water 160 ft in depth (above the fill in the shaft) was continuously pumped to the catch basin. In August 2007, when the shaft was nearly empty of water, the shaft was completely backfilled. Division Geologist Dave Darby reported in an email to Pam Grubaugh (August 6, 2007) that an additional 165 ft. of shaft was filled with soil and a trench was excavated to discharge the muddy surface layer, which was too heavy to pump.

Attachment 5 of App. 3.7X states that the backfill of shaft #2 was completed in July 2007. Section 3.7-5(3)(6) of the application states that in 2008, a two foot cap of bentonite was placed four feet beneath the surface grade inside the shaft collar to prevent water from reaching the surface. The 1.2 acre disturbed area around the shaft was reseeded in 2008. Settlement over the year Sept. 2008 to Aug. 2009 was 1.4 ft. (Section 3.7-5(3)(2) and Sec. 3.7-5(3)(6) and App. 3.7X). The bond release site inspection will provide an indication of the stability of the site after almost 3 years. A recommendation for bond release can only be made after a site visit.

Findings:

The Permittee has reclaimed the site in accordance with approved plans. The bond release site inspection will provide an indication of the stability of the site after almost 3 years.

Due to the circumstances involved in the closure of shaft #2, the bond release inspection required by R645-301-880.220 will be instrumental to the Divisions decision to release Phase 1 bond.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Reclamation treatments (seeding and gouging) are shown as-built reclamation treatment areas Map 3.7-16AB (Vol. 16, Ex. 20). These sediment control measures are further described in Section 3.7-5(4)(5). The regraded site was covered with hay (2 tons/ac.) that was gouged into the surface to a depth of 12 to 18 inches before seeding. The hydroseeding operation was followed by a surface application of 1.5 tons/ac hay mulch blown on the surface with 500 lbs/ac tackifier.

The Crandall Canyon main drainage channel CCRD-11 is depicted in cross-section in Attachment 1, Reclamation Hydrology Calculations. This channel was covered with soil to fill the voids in the riprap and the channel was seeded. Woody species were planted along the channel length in 2004, as described in Section 3.7-5(3)(7).

The seed mix used on the reclaim site and the reclaimed channel is provided in a table in Section 3.7-5(3)(7).

Operational water monitoring site B26 is immediately downstream of the reclaimed facilities area. Site B-22-1 is at the mouth of the canyon, downstream of the Topsoil Stockpile No. 2.

Findings:

The Permittee has adequately applied best management practices to control erosion and prevent sediments from leaving the site.

RECOMMENDATIONS:

The bond release site inspection will provide an indication of the stability of the site after almost 3 years. Due to the circumstances involved in the closure of shaft #2, the bond release inspection required by R645-301-880.220 will be instrumental to the Divisions decision to release Phase I bond.